Patent Claims:

1. Projection lens, having an object plane, having an image plane, having a lens arrangement and having at least one gas chamber filled with gas or through which gas flows, wherein the gas chamber is constructed as an at least approximately plane-parallel manipulation chamber, and wherein the manipulation chamber in connected with pressure change means.

2. Projection lens, having an object plane, having an image plane, having a lens arrangement and having at least one gas chamber filled with gas or through which gas flows, wherein that the gas chamber is constructed as an at least approximately plane-parallel manipulation chamber, and wherein the manipulation chamber in connected with gas composition change means.

3. Projection lens, having an object plane, having an image plane, having a lens arrangement and having at least one gas chamber filled with gas or through which gas flows, wherein that the gas chamber is constructed as an at least approximately plane-parallel manipulation chamber, and wherein the manipulation chamber in connected with pressure change means and gas composition change means.

4. Projection lens according to claim 1, 2 or 3, wherein the manipulation chamber is located between the lens arrangement and the image plane.

5. Projection lens according to claim 1, 2 or 3, wherein the manipulation chamber is located in the lens arrangement.

6. Projection lens according to claim 5, wherein the manipulation chamber is arranged between an end plate and the lens situated adjacent to the end plate.

7. Projection lens according to claim 5, wherein an end plate of the lens arrangement is bipartite, and wherein the two end plate parts are arranged at a spacing from one another and form the manipulation chamber between them.

8. Projection lens, having a lens arrangement comprising
a first lens group (LG1) of positive refractive power,
a second lens group (LG2) of negative refractive power,
a third lens group (LG3) of positive refractive power,
a fourth lens group (LG4) of negative refractive power,
a fifth lens group (LG5) of positive refractive power, and
a sixth optical group (LG6),
wherein there is provided in the sixth optical group a first optical element with radii of curvature R1 and R2, a thickness d1 and a diameter DU1, wherein it holds that $|R1| > 3000$ mm, $|R2| > 3000$ mm and

$$\frac{d1}{DU1} > \frac{1}{5}.$$

9. Projection lens according to claim 8, wherein it holds that $|R1| > 5000$ mm and $|R2| > 5000$ mm.

10. Projection lens according to claim 8, wherein it holds that

$$\frac{d1}{DU1} > \frac{1}{4} \text{ preferably } \frac{d1}{DU1} > \frac{1}{3}.$$

11. Projection lens according to claim 8, 9 or 10, wherein the first optical element and a second optical element of the sixth optical group enclose a gas chamber, wherein it holds for the radius of curvature R3 of the surface of the second optical element, which faces the first lens, that: $|R3| > 3000$ mm.

12. Projection lens according to claim 11, wherein it holds for the radius of curvature R3 that: $|R3| > 5000$ mm.

13. Projection lens according to claim 11 or 12, wherein it holds for the radius of curvature R4 of the further surface of the second optical element that:
$|R4| > 3000$ mm, preferably $|R4| > 5000$ mm.

14. Projection lens according to claim 11, wherein the second optical element has a thickness d2, wherein it holds that:
$d1+d2 > 60.0$ mm.

15. Projection lens according to one of the claims 1 to 14, wherein a lens with an aspheric surface is provided in the first lens cluster (LG1).

16. Projection lens according to claim 15, wherein the lens with the aspheric surface is arranged upstream of the first bulge in the light direction.

17. Projection lens according to claim 15 or 16, wherein the aspheric surface is arranged on the first curved surface of the aspheric lens.

18. Projection lens according to at least claim 1, wherein the projection lens has on the image side a numerical aperture of at least 0.75, preferably 0.85.

19. System for projection lens, having an object plane, having an image plane, having a lens arrangement and having at least one gas chamber filled with gas or through which gas flows, wherein the gas chamber is constructed as an at least approximately plane-parallel manipulation chamber, and wherein the refractive index can be varied in the manipulation chamber by pressure changes.

20. System for projection lens, in particular for microlithography, having an object plane, having an image plane, having a lens arrangement and having at least one gas chamber filled with gas or through which gas flows,

wherein the gas chamber is constructed as an at least approximately plane-parallel manipulation chamber, and wherein the refractive index can be varied in the manipulation chamber by changes in gas composition.

21. System for projection lens, in particular for microlithography, having an object plane, having an image plane, having a lens arrangement and having at least one gas chamber filled with gas or through which gas flows, wherein the gas chamber is constructed as an at least approximately plane-parallel manipulation chamber, and wherein the refractive index can be varied in the manipulation chamber by pressure changes and changes in gas composition.

22. System for projection lens according to claim 19, wherein the offset of the refractive index can be set via the gas composition in such a way that the refractive index can be manipulated in both directions.

23. System for projection lens according to claim 20, wherein the offset of the refractive index can be set via the gas composition in such a way that the refractive index can be manipulated in both directions.

24. System for projection lens according to claim 21, wherein the offset of the refractive index can be set via the gas composition in such a way that the refractive index can be manipulated in both directions.

25. System for projection lens according to claim 19, wherein in addition to the manipulation chamber a further at least approximately plane-parallel manipulable gas interspace is provided, for the purpose of removing field curvature, on a substrate, which is to be exposed, in the sixth optical group (LG6).

26. System for projection lens according to claim 20, wherein in addition to the manipulation chamber a further at least approximately plane-parallel manipulable gas interspace is provided, for the purpose of removing field curvature, on a substrate, which is to be exposed, in the sixth optical group (LG6).

27. System for projection lens according to claim 21, wherein in addition to the manipulation chamber a further at least approximately plane-parallel manipulable gas interspace is provided, for the purpose of removing field curvature, on a substrate, which is to be exposed, in the sixth optical group (LG6).

28. Projection exposure machine in microlithography, having a light source which outputs radiation of wavelengths shorter than 370 nm, where it comprises a projection lens according to at least one of the preceding claims.

29. Method for producing microstructured components, in the case of which a substrate provided with a light-sensitive layer is exposed to UV light by means of a mask and a projection exposure machine with a lens arrangement, wherein an at least approximately plane-parallel manipulation chamber which is connected to a gas source is created in the projection exposure machine, the refractive index being manipulated by pressure changes and/or changes in gas composition.

30. Method according to claim 29, wherein the manipulation chamber is installed in the projection lens on the input side of the lens arrangement or on the side of the mask.

31. Method according to claim 29, wherein the manipulation chamber is installed on the output side of the lens arrangement or on the side of the wafer.

32. Method according to claim 29, wherein the manipulation chamber is installed between the lens arrangement and the image plane.

33. Method according to claim 29, wherein the plane-parallel manipulation chamber is sealed off from the surroundings, and in that a gas mixture is led to the manipulation chamber in a controlled fashion via a pressure connection.

34. Method according to claims 29 and 33, wherein when the projection lens is being tuned a filling gas is introduced which is subsequently exchanged by the operator for a gas mixture.

35. Method according to claim 27, wherein provided in addition to the manipulation chamber is a further manipulable gas interspace, by means of which a field curvature on the substrate to be exposed can be removed.

36. Method for producing microstructured components, in the case of which a substrate provided with a light-sensitive layer is exposed by ultraviolet light by means of a mask and a projection exposure machine according to claim 26 and, if appropriate, is structured after the development of the light-sensitive layer in accordance with a pattern included on the mask.

37. Projection lens for the microlithography, having an object plane, having an image plane, having a lens arrangement and having at least one gas chamber filled with gas or through which gas flows, wherein the gas chamber is constructed as an at least approximately plane-parallel manipulation chamber, and wherein the manipulation chamber in connected with pressure change means.

38. Projection lens for the microlithography, having an object plane, having an image plane, having a lens arrangement

and having at least one gas chamber filled with gas or through which gas flows, wherein the gas chamber is constructed as an at least approximately plane-parallel manipulation chamber, and wherein the manipulation chamber is connected with gas composition change means.

39. Projection lens for the microlithography, having an object plane, having an image plane, having a lens arrangement and having at least one gas chamber filled with gas or through which gas flows, wherein the gas chamber is constructed as an at least approximately plane-parallel manipulation chamber, and wherein the manipulation chamber is connected with pressure change means and gas composition change means.